Before the
Federal Communications Commission
Washington, DC 20554

In the Matter of Spectrum Policy Task Force Request for Public Comment on Issues Related to Commission's Spectrum Policies	ET Docket No. 02-135

Reply Comments of Nortel Networks

INTRODUCTION

Nortel Networks (Nortel) hereby responds to certain comments filed in response to the questions of the Spectrum Policy Task Force. These reply comments focus on two issues of paramount importance in establishing sound spectrum policy: interference protection and spectral efficiency.

INTERFERENCE PROTECTION

In its submission XtremeSpectrum, Inc. (Xtreme) proposed a framework for revising the definition of "harmful Interference."[1] Nortel Networks believes that the proposed approach would stifle, rather than promote, further innovation and improvement in the efficient use of spectrum. Nortel Networks urges the Commission to assess carefully the full ramifications of such a proposal.

[1] *See* Comments of XtremeSpectrum, Inc. at 7-9, ET Docket No. 02-135, (filed July 8, 2002).

Xtreme summarizes its proposed framework in three parts, each of which will be separately addressed.

"(1) assess how much degradation or interruption a service can reasonably be expected to tolerate;"

By establishing an arbitrary acceptable interference level, adoption of this principle would eliminate research into spectrally efficient protocols, which rely on technologies targeting increased sensitivity and discrimination at the noise floor. Successfully deployed CMRS technologies such as CDMA and WCDMA employ sophisticated power and receiver management techniques specifically designed to lower intra-system interference and thus the noise floor, and to make productive use of the "newly exposed" clear bandwidth. These systems have dramatically increased the effective capacity of CMRS spectrum over the last 10 years. Application of Xtreme's principle would eliminate this productive avenue of innovation.

Nortel Networks is equally concerned with the proposal's implications on service quality within the reduced headroom. Clearly any "interruption of service" has an economic impact, and regulatory protection in such cases becomes a material matter.

"(2) translate that into permissible levels of received interference;"

In its comments, Nortel outlined the appropriate and inappropriate criteria for receiver regulation.[2] The specification of permissible levels of received interference effectively defines the input characteristics of receivers, an outcome that Nortel Networks believes is counterproductive. By placing boundaries on receiver performance, any regulation would effectively block innovations, which improve performance beyond the defined limit similar to the impact of a regulatory definition of acceptable degradation.

[2] *See* Comments of Nortel Networks at 6-9, ET Docket No. 02-135, (filed July 8, 2002).

Spectral efficiency within defined services would be essentially capped at the regulated level.

Many modern receivers, such as those using spread spectrum, are able to work below the noise level because of the spreading gain. In addition, some passive services, like radio astronomy and deep space communications, regularly work below the noise level (principally through the use of very long integration times) and will also naturally evolve their performance, which could be capped by absolute definitions of permissible interference. Extra interference, even at very low levels, is a concern in most radio systems. Radio system designers do try to use spectrum efficiently. Additional noise from secondary devices should not be allowed to compromise existing performance or preclude future advancements.

> **"and (3) translate that in turn into maximum permissible emissions levels from the secondary or unlicensed device."**

The ramifications of this final statement are even more significant upon further analysis. In view of the additive nature of multiple interfering sources, it becomes complex to define maximum allowable levels for a device when the number and distribution of devices is unregulated. This issue is best resolved by placing regulatory limits, which limit aggregate inbound interference, or by applying regulatory mechanisms, which locate, identify, and control individual sources of interference. In the past, the Commission has chosen to group uncontrolled devices within their own bands, with the result that they both gain and suffer from their own engineered performance. In effect, some level of feedback is introduced which regulates proliferation of noisy

devices. By regulating access into otherwise controlled spectrum, this self-restraining mechanism would be lost.

Many modern mobile communications systems, including Nortel's CDMA products, are limited in capacity by the noise level. They handle more and more traffic until the noise level limits the desired error rates. Thus any increase in the noise floor, even if it does not disrupt an individual link, will cause the units to raise their signal levels to compensate, increasing the level of intra-system interference and, in so doing, reducing the overall system capacity.

There are also many other radio systems in use that adapt power levels to changes in transmission conditions and interference. An increase in the noise level due to secondary or unlicensed device operations would cause these systems to operate with higher power transmissions than planned, and thereby increase power consumption, increase interference to other systems and adversely affect equipment lifetimes. Interference affects more aspects of a radio system than just the individual radio links.

In summary, Nortel Networks believes that Xtreme's proposal would have the practical effect of reducing the efficient use of spectrum, rather than enhancing it. Xtreme's assertion that UWB technology can "add non-interfering services to spectrum already in use" is false in the case of CDMA & WCDMA, as any increase in the overall noise floor has a direct and measurable negative impact on those radio technologies designed to reduce noise and take advantage of the "recovered" bandwidth.

SPECTRAL EFFICIENCY

Nortel disagrees with ArrayComm's suggestion to define or measure spectrum efficiency prior to an auction. As indicated in the previous Nortel comments, technical

spectral efficiency measures should not be used for the regulation of the spectrum. Other commenters agree with Nortel.[3] As noted in BellSouth's comments, for example, system operators must make a range of system design tradeoffs, one of which is spectral efficiency. Imposing a certain measure in one parameter without consideration of the others would result in sub-optimal systems. Sprint has also highlighted the potential negative impact on spectrum efficiency if other systems are allowed to be overlaid on licensed bands.

CONCLUSION

In conclusion, for the reasons stated above, Nortel believes that the Spectrum Policy Task Force should not include the recommendations of Xtreme on interference protection and ArrayComm on spectral efficiency in its final report and recommendations to the Commission.

Respectfully,

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[3] *See* Comments of BellSouth Corporation at 14, ET Docket No. 02-135, (filed July 8, 2002); *see also* Comments of Sprint at 17-21, ET Docket No. 02-135, (filed July 8, 2002).

July 23rd 2002